Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 2 of the Commission's Rules to Realign the 76-81 GHz band and the Frequency Range Above 95 GHz Consistent with International Allocation Changes	)	ET Docket No 03-102
	)	
Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50 2-50 4 GHz and 51 4-71 0 GHz Bands	)	ET Docket No. 99-261

REPORT AND ORDER

Adopted: February 4, 2004 **Released: February 12, 2004**

By the Commission. Commissioner Adelstein issuing a separate statement.

INTRODUCTION

1 By this Report and Order, we reallocate spectrum in the 76-81 GHz frequency band and the frequency bands above 95 GHz to conform our United States Table of Frequency Allocations (U S Table)[1] with recent changes to the International Table of Frequency Allocations (International Table) maintained by the International Telecommunication Union (ITU) Specifically, this realignment of allocations will achieve consistency with the international allocation changes made at the World Radiocommunication Conference (Istanbul, 2000) (WRC-2000).[2] The primary intent of the WRC-2000 realignment of allocations in the 76-81 GHz band and bands above 95 GHz was to place scientific services, such as the Earth-exploration satellite service (EESS) and radio astronomy service (RAS), in spectrum better suited to their needs[3] Regarding the 76-77 GHz band, we are adopting a primary RAS allocation and secondary space research service (SRS) allocation that will share this band with unlicensed vehicle radar systems We are not, however, implementing the proposed secondary amateur-satellite allocation in this band due to anticipated interference concerns with vehicle radar systems To protect passive services in the 55.78-56 26 GHz band, we are adopting a limit on the maximum power spectral density that can be delivered to a fixed service transmitter antenna. We believe that the rule amendments set forth herein will promote future developments in technology and

[1] *See* 47 C.F R § 2 106 (Table of Frequency Allocations) for the complete listing of existing spectrum allocations and footnotes to the Table

[2] *See Final Acts of the World Radiocommunication Conference (WRC-2000)*

[3] The EESS is a radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which (1) Information relating to the characteristics of the Earth and its natural phenomena is obtained from active sensors or passive sensors on earth satellites, (2) Similar information is collected from air-borne or earth-based platforms; (3) Such information may be distributed to earth stations within the system concerned, and (4) Platform interrogation may occur *See* 47 C F R § 2.1.

equipment, position scientific services to increase our understanding of physical phenomena, and provide consumers with access to new products and communications services Finally, this action also continues our efforts to promote the development and growth of the "millimeter wave" spectrum [4]

BACKGROUND

2 The frequency range above 71 GHz is well suited for many scientific passive-sensing and RAS applications due to its bandwidth and propagation characteristics The majority of current spaceborne passive-sensing and radio astronomy allocations in the range 71-275 GHz were established at the 1979 World Administrative Radio Conference (WARC-79) and were codified in the Commission's rules in January 1984 [5] Since then, there have been many advances in our scientific understanding of passive sensing and radio astronomy and their requirements in terms of technology and appropriate frequency bands The 1997 World Radiocommunication Conference (WRC-97) realigned allocations in the 50 2-71 GHz range in a way that allows passive services to make better use of the band while still providing spectrum for other users [6] Now, passive service advocates are expressing substantial interest in using frequencies in the range above 71 GHz. [7] In addition, proponents of radio communication services are interested in the frequency bands above 71 GHz because the available bandwidth would permit high data rate transmissions and the propagation characteristics would allow for extensive frequency reuse [8] WRC-2000 reallocated spectrum above 71 GHz to ensure that the allocations in this region of the spectrum are better aligned with potential applications [9] Specifically, WRC-2000 realigned the 76-81 GHz band and frequency bands above 95 GHz on a primary basis variously for the amateur, amateur-satellite, EESS, fixed, fixed-satellite (FSS), inter-satellite (ISS), mobile, mobile-satellite (MSS), RAS, radiolocation, radionavigation, radionavigation-satellite (RNSS), and SRS Additionally, WRC-2000 realigned these bands on a secondary basis for amateur, amateur-satellite, RAS, radiolocation, and SRS

3 The EESS (passive) includes passive radio sensing operations that have many applications in agriculture, weather forecasting, and the study of global changes of the Earth and its environment. Passive sensing is a remote sensing technique that is based on detection of electromagnetic energy generated by natural sources, such as the surface of the Earth and its atmosphere Passive sensors detect naturally reflected or radiated energy from the Earth's surface at

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[4] The term "millimeter wave" derives from the wavelength of radio signals at frequencies between 30 GHz and 300 GHz, which range between 1 millimeter at 300 GHz and 10 millimeters at 30 GHz

[5] *See Amendment of Part 2 of the Commission's Rules Regarding Implementation of the Final Acts of the World Administrative Radio Conference, Geneva, 1979, Second Report and Order,* Gen Docket No. 80-739, 49 FR 2357 (January 19, 1984) Examples of passive services include remote sensing and meteorological observations. *See also Final Acts of the World Administrative Radio Conference (WARC-79).*

[6] *See Final Acts of the World Radiocommunication Conference (WRC-97).*

[7] For example, passive sensing techniques on frequencies above 71 GHz can be used to assess climate and weather changes of the Earth and its environment. Active sensing is a remote sensing technique that provides its own energy source for illumination The active sensor emits radiation which is directed toward the target to be investigated. The radiation reflected from that target is detected and measured by the sensor. *See* www sbg ac at/geo/idrisi/ccrs_tutorial/www ccrs nrcan gc ca/ccrs/eduref/tutorial/chap1/c1p6e html#c1p6_11.

[8] Radio signals on frequencies above 71 GHz generally have short propagation distances and can be transmitted with narrow beamwidth, and high directivity using small antennas The ability to operate many highly directive antennas in an area may facilitate high spectrum reuse and high user density

[9] *See Final Acts of the World Radiocommunication Conference (WRC-2000).*

some altitude above the ground and use the amount of energy emitted, transmitted, or reflected to observe and measure objects from a distance in order to determine certain physical properties of the object For example, parameters such as temperature and water vapor profiles, and the concentration of ozone and other trace gases that are radiantly and chemically active can be measured regionally and globally only by passive sensors aboard satellites

4 Similarly, the RAS is a passive service that receives radio waves of cosmic origin and allows scientists to better understand our universe Historically, the millimeter wavelength range was one of the few spectral regions not fully explored by astronomers because special observing conditions and instruments are needed to make observations in this frequency range. Recently, however, astronomical research has become increasingly active in this spectral range because frequencies in this range are particularly well suited for studies of star formation, the properties of the interstellar medium, the chemical evolution of the Universe, detection of extra-solar planets and many other phenomena. United States astronomers operate several large single dish telescopes and interferometers operating in this spectral range

5 In a separate proceeding, the Commission has already realigned the allocations in certain other bands above 71 GHz in accordance with the international reallocations of these bands Specifically, in the *Report and Order* in WT Docket No 02-146 (*70/80/90 GHz Report and Order*), the Commission reallocated the 71-76 GHz, 81-86 GHz, 92-94 GHz, and 94 1-95 GHz bands in accordance with the *1992 Final Acts of the World Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Radio Spectrum* (*Final Acts of WRC-1992*) and most of the international reallocations in the *Final Acts of WRC-2000*.[10] As set forth in that action, these bands are now allocated on a primary basis variously for the fixed, mobile, fixed-satellite, and mobile-satellite, broadcasting, broadcast satellite, radiolocation, and radio astronomy services. In addition, portions of these bands are allocated on a secondary basis for space research and radio astronomy. In the *70/80/90 GHz Report and Order*, the Commission also adopted service rules to allow a broad range of licensed fixed and mobile services and unlicensed to operate in the 71-76 GHz, 81-86 GHz, 92-94 GHz, and 94.1-95 GHz bands. The rules adopted in our action herein will not impact or overlay the rules adopted in the *70/80/90 GHz Report and Order* Also, the existing entries to the International Table Allocations and the United States Table of Allocations in Section 2.106 of the rules for the remaining portion of the spectrum between 71 GHz and 95 GHz already conform to the current international frequency allocations for that band, as adopted in the *Final Acts of WRC-1992* [11]

DISCUSSION

6 On April 28, 2003, the Commission adopted a *Notice of Proposed Rule Making* (*Notice*) that proposed changes to the U S Table for the frequency band 76-81 GHz and for frequencies above 95 GHz [12] The Commission initiated this proceeding at the request of the National Telecommunications and Information Administration (NTIA).[13] NTIA completed a review of the results of WRC-2000 and recommended changes to the frequency bands above 71 GHz based on

[10] *See Report and Order* in WT Docket No. 02-146, adopted October 16, 2003, FCC 03-248 (released XXX XX, 2003)

[11] *See* 47 C F R 2 106

[12] *Notice of Proposed Rule Making and Order*, 18 FCC Rcd 8347 (2003)

[13] *See* Letter to Acting Chief, Office of Engineering and Technology from the Associate Administrator, Office of Spectrum Management at NTIA, July 18, 2001

coordination with the Interdepartment Radio Advisory Committee (IRAC) [14] The decisions made in this Report and Order largely follow the WRC-2000 changes and the subsequent review by NTIA

A Reallocation of the Frequency Bands Above 76 GHz

7 *Proposals* The 76-81 GHz band is currently allocated to the radiolocation service on a primary basis and the amateur service on a secondary basis, except the amateur allocation is primary in the 77 5-78 GHz portion. Further, the 77-81 GHz band is allocated to the amateur-satellite service on a secondary basis, except the 77.5-78 GHz portion has primary status Finally, the 76-77 GHz band is also used by vehicular radar systems on an unlicensed basis under Section 15.253 of the Commission's Rules [15]

8 The primary purpose of the WRC-2000 action realigning spectrum in bands above 76 GHz was to accommodate the requirements of RAS and EESS (passive) operations Specifically, RAS must operate in bands that meet the requirements of spectral line[16] and wideband continuum observations [17] Additionally, EESS must operate in bands that are optimal for microwave limb sounding and nadir sounding of water vapor and other atmospheric elements and components.[18]

9 To aid the RAS and EESS in meeting their operating requirements and promote consistency to the greatest extent possible between the U S. Table and the ITU International Table, the Commission proposed in the *Notice* to incorporate the changes from WRC-2000 for the 76-81 GHz and

[14] IRAC is a body that consists of 23 Federal Government agencies, with an FCC staff person as the liaison for IRAC The basic functions of the IRAC are to assist the Assistant Secretary of the U.S Department of Commerce in assigning frequencies to U.S. Government radio stations and in developing and executing policies, programs, procedures, and technical criteria pertaining to the allocation, management, and use of the spectrum. For further information visit IRAC's website at http //www ntia doc gov/osmhome/irac html

[15] *See* 47 C F R §15 253

[16] A spectral line is electromagnetic radiation emitted at a specific frequency by an atom or molecule Each type of atom or molecule emits radiation at its own unique set of frequencies, thus, astronomers can explore the properties of stars, interstellar matter or other celestial bodies containing a particular molecule by tuning a radio telescope to one of the characteristic frequencies of that molecule. For example, carbon monoxide (CO) has a spectral line at 115 GHz (or a wavelength of 2.7 mm) Over 2100 spectral lines of 80 chemical compounds have been identified in the 71-275 GHz range, and more have been predicted Astronomers are interested in preserving access to as many spectral lines as possible, because these lines may yield unique information about a host of phenomena in the universe *See* http //imagine gsfc nasa gov/docs/dictionary html

[17] The spectrum of the celestial radio waves reaching the earth contains a broad continuum that covers the whole range of frequencies that can penetrate the earth's atmosphere. The continuum arises mainly from two mechanisms. (1) thermal emission, the intensity of which is proportional to the temperature of the emitter; and (2) non-thermal emission, mostly produced by the synchrotron process, in which very high-speed electrons spiral around magnetic-field lines By studying the continuum emissions of celestial bodies, astronomers can determine the temperature, magnetic field and other properties of these bodies
See, e g , http //www7 nationalacademies org/bpa/projects_corf_view1195 pdf

[18] A Microwave Limb Sounder ("MLS") measures naturally-occurring microwave thermal emissions from the Earth's atmosphere to remotely sense vertical profiles of selected atmospheric gases, temperature and pressure. For example, a limb-sounding millimeter-wave radiometer (183 GHz, 184 GHz, and 204 GHz) can be used to map global distributions of water vapor, ozone, and chlorine monoxide Nadir sounding (also known as vertical sounding) is used to retrieve vertical profiles of temperature trace gases, such as water vapor, by making observations at wavelengths that have significant attenuation The principle behind nadir sounding is that by making observations at numerous wavelengths near a broad absorption line, different altitudes in the atmosphere can be investigated

above 95 GHz bands into the U S Table [19] The Commission proposed several primary and secondary service allocation changes in these bands and also invited comment on the feasibility of sharing between vehicle radar systems and the proposed RAS, SRS, and amateur-satellite services in the 76-77 GHz band Consistent with the proposed realignment of allocations, the Commission also proposed to update several footnotes to the U S Table (US74, US211, US246, US263, and US342) concerning RAS and EESS operations It further proposed to replace international footnotes 5 340[20] and 5.149[21] with U S. footnotes US246 and US342, respectively, and apply these footnotes to additional bands To be consistent with WRC-2000 changes, the Commission also proposed to add or delete other U S and international footnotes where applicable

10 In the *Notice*, the Commission proposed to implement a new allocation to the RAS on a primary basis in the 76-77 5 GHz and 78-81 GHz band segments and on a secondary basis in the 77.5-78 GHz band segment Additionally, the Commission proposed new secondary allocations for the space research service (downlink) throughout the 76-81 GHz band and amateur-satellite service in the 76-77 5 GHz band segment.

11 *Comments* The only comments filed in response to the *Notice* address the 76-81 GHz band Comments were filed by the Short Range Automotive Radar Frequency Allocation Group (SARA). the Long-Range Automotive Radar Frequency Allocation Group (LARA), the Delphi Corporation (Delphi), and the Alliance of Automobile Manufacturers (Alliance) on the feasibility of vehicular radar systems sharing spectrum with the proposed RAS, SRS, and amateur-satellite services for the 76-81 GHz band.[22] Specifically, these parties are concerned that adaptive cruise control (ACC) and short range automotive radars (SRRs) in the 76-77 GHz band and the eventual use of SRRs in the 77-81 GHz band could be endangered by the proposed new RAS, SRS, and amateur-satellite allocations Therefore, these parties urge the Commission to make no new allocations in this spectrum range until it can be determined that vehicular radar operations will not be jeopardized Delphi contends that vehicular radar operations are important to increased highway safety, and any new allocations should be required to accept any interference caused by vehicular radars, should not be permitted to interfere with vehicular radars and must not be accommodated by changes to the technical rules for vehicular radar operations.[23] LARA and Delphi oppose the allocation of the 76-77 GHz band to the RAS, SRS, and amateur-satellite service due to insufficient justification for these services needing this spectrum, insufficient knowledge of how useful the spectrum will be to these services, and a lack of technical information needed to conduct compatibility studies. Delphi also argues that interference with vehicular systems can cause such systems to malfunction or not to perform at all, decrease in design flexibility and functionality, increase in design cost and selling price to consumers, and reduce spectrum utilization SARA also opposes the proposed RAS and SRS allocations at this time for the same reasons stated above, except that its comments are specifically directed to the 77-81 GHz band

12 LARA also questions whether SRS receiving earth stations can be located in a manner that ensures they will not be negatively affected by vehicular radar emissions LARA contends that mitigation techniques such as shielding and control over the immediate vicinity can be used to protect

[19] *See Notice*, *supra* at 8355-8362

[20] This footnote prohibits emissions in certain bands. *See* Appendix A, Final Rules, for a complete list.

[21] This footnote urges administrations to take all practicable steps to protect the radio astronomy service from harmful interference when making assignments in certain bands *See* Appendix A, Final Rules, for a complete list of the RAS bands that are protected

[22] *See* Comments of SARA, LARA, and Delphi

[23] *See* Comments of Delphi at 6

SRS operation, and, therefore no changes should be made to vehicular radar rules.[24] Delphi also states that it is not aware of any instances where SRS is using spectrum above 24 GHz.

13. While generally opposing any new allocation that could hinder SRRs, LARA states that sharing could be feasible between SRRs and RAS given that 1) the number of millimeter wave observatories are expected to remain limited, 2) RAS receivers are usually located on high mountains or in remote areas, and access to RAS telescopes is controlled at distances of at least one kilometer, 3) SRRs are typically located less than one-half meter above the ground, increasing signal attenuation by ground clutter that limits above-horizon radiation, 4) the narrow beamwidth of SRRs and radio telescope receiving antennas results in very low potential for mutual coupling that would result in interference, 5) interference mitigation for RAS can be accomplished through the erection of fences and other local shielding, and 6) that at frequencies this high, radio wave propagation is essentially line-of-sight, meaning SRR sensors would have to point directly at a RAS telescope to cause interference. LARA also states that any protection of RAS facilities that may be deemed necessary should be implemented on a site-by-site basis, rather than any broadly applicable rule limiting ACC operations.[25]

14. LARA also opposes the proposed secondary allocation for amateur-satellite service in the 76-77 GHz band, arguing that this allocation would be premature given that the Radio Amateur Satellite Corporation (AMSAT) has stated that 24 GHz is currently the highest frequency in use for this service and that amateur-satellite designers currently avoid higher frequency bands that create a challenge for poorer countries. If the allocation is implemented, LARA urges the Commission to adopt power limits on amateur operations because Part 97 permits up to 1500 watts peak envelope power for such operations. LARA sees these high power limits as possibly causing interference with vehicle radars.[26] Delphi argues that the amateur satellite allocation proposal contradicts the Commission's decision in 1998 that allowed vehicular radars in the 76-77 GHz band and removed the amateur satellite allocation to avoid potential interference problems.[27] Delphi points out that the Commission found that removal of the amateur-satellite allocation from this band would not have an immediate impact on amateur operators because there was little use of this band, and that sufficient allocations existed elsewhere to ensure unencumbered use of the amateur satellite service.[28] Delphi and LARA believe the Commission should be guided by its 1998 analysis when it suspended access to the 76-77 GHz band by the amateur-satellite service.

15. Regarding the 77-81 GHz portion of the allocation proposal, SARA argues that this band should not be allocated to the SRS until further compatibility studies are conducted. SARA explains that the 77-81 GHz band has been identified by the European Conference of Postal and Telecommunications Administrations as a possible future home for SRR operations that will be forced to relocate from the 24 GHz range before 2014. It provides arguments similar to LARA's above regarding the possible sharing of the 77-81 GHz band between SRRs and the proposed services and requests that we authorize the use of this band for SRR operations.[29] Delphi requests that we commence a proceeding to consider granting vehicular radars access to the 77-81 GHz band per the Part 15

[24] *See* Comments of LARA at 15.

[25] *See* Comments of LARA at 10-12.

[26] Specifically, without new limits on amateur satellite operations, the maximum transmitting power of earth station antennas positioned at low elevation angles would cause sidelobe emissions to extend to the ground at a level more than sufficient to cause harmful interference to vehicular radars.

[27] *See* Comments of Delphi at 10.

[28] *See Amendment of Parts 2, 15, and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, Third Report and Order*, ET Docket No. 94-124, FCC 98-150 (1998).

[29] *See* Comments of SARA at 2.

unlicensed devices rules.[30]

16 *Decision* While we recognize the concerns of commenters regarding the allocation of new services in the 76-81 GHz and above 95 GHz bands, we find that implementing the allocation changes from WRC-2000 in these bands is necessary to provide EESS and RAS operations with the flexibility to operate in spectrum suited to meet their needs This action will also promote consistency between the U S Table and the International Table For the reasons indicated by LARA, we conclude that, as a practical matter, sharing conflicts are highly unlikely in any portion of these bands. However, we also find that the vehicular radar community raised valid concerns that must be addressed We note that most of the RAS and EESS allocations below 174 8 GHz are co-primary with other active radio services Licensed services will have to share with the passive services and protect them in many cases For the RAS case, we believe that the impact of this sharing constraint will be minimal since RAS millimeter wave receivers are usually located on high mountains in order to escape atmospheric absorption of incoming signals from space Such receivers are in rural areas, not the urban areas where we anticipate most use of these bands by FCC-regulated users

17 Regarding the 76-77 GHz band, we recognize that vehicular radar operations in this band may be able to increase the level of safety on highways and benefit the public We agree with LARA that sharing between RAS and SRS and vehicular radar operations is possible. Most significantly, under Section 15.253 of the rules, vehicular radar systems operating in the 76-77 GHz band must not exceed certain emission limits, depending on the mode of operation, at a distance of 3 meters from the exterior surface of the radiating structure, which reduces the likelihood that they will cause interference Also, RAS observatories are few, and are sited and designed to be protected from sources of interference Therefore, we are allocating the 76-77 GHz band to the RAS on a primary basis Similarly, SRS users should be able to site earth stations or use shielding to protect their operations from vehicular radar operations Further, we see no evidence that SRS downlinks have the potential to interfere with vehicular radar operations or endanger the user of these devices Therefore, we will allocate the 76-77 GHz band to the SRS on a secondary basis

18 In addition, we find evidence of potential interference conflicts between the amateur-satellite service and vehicular radar systems Specifically, amateur stations are operated by hobbyists who could deploy their earth stations anywhere and amateurs are permitted great flexibility in the type of antenna and the power they use to transmit On this basis, we anticipate that an amateur earth station could either receive interference to its operations or cause interference to a passing vehicular radar device Therefore, we are not implementing the proposed secondary amateur-satellite allocation for the 76-77 GHz band at this time We will, however, retain the existing secondary amateur service allocation We note that the existing secondary amateur service allocation in this band is currently suspended and restricted until technical sharing criteria are developed to address potential sharing problems in this band [31] We continue to find that not allowing amateur operations in the 76-77 GHz band is not a significant burden on this service because amateurs typically do not operate at these higher frequencies and they are permitted to operate in the adjacent 77-81 GHz band.

19 In the *Notice*, the Commission asked for comment on the technical limits for each service that could promote same band operation as well as possible interference mitigation procedures. Regarding the emission limits and other technical rules for vehicular radar devices in Section 15.253, we see no need to modify these rules because there is no record to indicate a need to change these

[30] *See* Comments of Delphi at 14

[31] This restriction was placed on amateurs in a Commission 1998 proceeding and is set forth in Part 97 of the Commission's rules at 47 C F R. §97 303. *See Amendment of Parts 2, 15, and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, Third Report ad Order,* ET Docket No 94-124, 13 FCC Rcd 15074, (1998)

regulations [32] Additionally, given our finding that there should not be any sharing problems between vehicular radar, SRS, and RAS services in the 76-77 GHz band, we do not see a need to address the status of vehicular radar services at this time

20 Regarding the 77-81 GHz segment, we are adopting domestically the RAS and SRS allocations as proposed in the *Notice* and set forth in Appendix A We find that it would be premature to prevent the domestic implementation of these allocations due to possible future use by vehicular radar systems, although we recognize that there is a great deal of ongoing international discussion about the current and future spectrum needs of SRR systems [33] Further, with regard to Delphi's request that we initiate a proceeding to establish rules to allow vehicular radar operations in the 77-81 GHz segment, entities may file petitions for rule making requesting the Commission to take such action Such petitions should include specific proposals for technical and other rules.

21 We are adopting our proposal set forth in the *Notice* to realign spectrum in the bands above 95 GHz This realignment will have little impact on the small number of systems that are currently implemented in these bands and no parties filed comments opposing these changes By this action, the amount of allocated spectrum available to most services, such as, amateur, amateur-satellite, EESS, FSS, ISS, RAS, radiolocation, and SRS will either increase or remain unchanged. Specifically, the allocation for amateur service will remain unchanged, amateur-satellite service allocation will remain unchanged, EESS allocation will increase by 7 8 gigahertz (from 60 gigahertz to 67.8 gigahertz), FSS allocation will increase by 2 gigahertz (from 53 gigahertz to 55 gigahertz), ISS allocation will increase by 4 2 gigahertz (from 35 gigahertz to 39.2 gigahertz), RAS allocation will increase by 81 gigahertz (from 48 gigahertz to 129 gigahertz), radiolocation allocation will increase by 2 5 gigahertz (from 37 gigahertz to 39 5 gigahertz), and SRS will increase by 24.75 gigahertz (from 60 gigahertz to 84 75 gigahertz). However, due to incompatibility with passive sensor operations, the amount of spectrum allocated for a few services will decrease Specifically, the allocation for fixed service will decrease by 24 8 gigahertz (from 117 gigahertz to 92.2 gigahertz), mobile service allocation will decrease by 24.8 gigahertz (from 127 gigahertz to 102 2 gigahertz), MSS allocation will decrease by 2 3 gigahertz (from 36 gigahertz to 33 7 gigahertz), radionavigation service allocation will decrease by 800 megahertz (from 36 gigahertz to 35 2 gigahertz), and RNSS allocation will decrease by 800 megahertz (from 36 gigahertz to 35 2 gigahertz) We find that the decreases in allocated spectrum for the above mentioned services will not affect the operability of each service

22 We recognize that spectrum sharing conflicts can result from placing certain of these services in the same or adjacent bands, such as placing RAS and satellite downlink services in the same band or in adjacent bands [34] We find, however, that because these bands are not expected to be used for anticipated applications in the foreseeable future, any potential sharing conflicts can be addressed at a later time as entities seek to make use of these allocations. By implementing a variety of allocations in these higher frequencies, we are providing a flexible allocation environment for applications to be developed. We will address potential interference conflicts between allocations or develop technical

[32] *See* 47 C F R §15 253

[33] *See* Comments of SARA at 3

[34] Spectrum sharing problems between satellite and RAS operations typically result because the satellite downlink services can transmit downward directly into sensitive RAS antennas. We are allocating primary RAS and FSS (downlinks) in the following adjacent bands RAS at 130-134 GHz and FSS (Downlinks) at 123-130 GHz, RAS at 155 5-158 5 GHz and FSS (downlinks) at 158 5-164 GHz, and RAS at 164-167 GHz and FSS (downlinks) at 167-168 GHz There are other primary satellite downlink services (amateur-satellite, RNSS, MSS, and ISS) that we are allocating on a co-channel or adjacent channel basis with RAS We also note that although there are also secondary allocations where RAS is in the same band or adjacent bands with a secondary satellite downlink service, we point out the primary service allocations since the secondary service allocations have to protect primary allocations from interference

sharing criteria, as appropriate, as future applications are developed or through the development of service rules The allocation changes we are making in the 76-81 GHz frequency band and frequency bands above 95 GHz will promote consistency between our U.S Table and the International Table

23 Finally, to make the U S Table consistent with WRC-2000 changes, the Commission proposed to delete the nine United States footnotes that were adopted in the *Table Clean-up Order* in DA No 02-1872[35] for the purpose of maintaining the status quo for the U S Table [36] Now that we are adopting the realignment of WRC-2000, these nine footnotes no longer apply. Therefore, we are removing these footnotes from Section 2 106 of the U S Table to reflect WRC-2000 implementation

B Maximum Power Density in the Band 55.78-56 26 GHz

24 *Proposals* In December 2000, the Commission adopted a *Report and Order* to realign allocations in the 50.2-50 4 GHz and 51 4-71 GHz frequency bands [37] One issue under consideration was whether to protect EESS services in the 55 78-56.26 GHz band by adopting a maximum power spectral density limit that can be fed to fixed service transmitter antennas. However, because that band was allocated to the fixed service on a primary basis and was available for any fixed point-to-point or point-to-multipoint use, the Commission deferred action on this issue, stating that it was premature to establish requirement to protect EESS in the 55 78-56 26 GHz band [38] At WRC-2000, the United States stated that "based upon studies contained within Recommendation ITU-R SA 1279,[39] sharing is feasible between the EESS passive and the high density applications in the fixed service (HDFS), provided that the parameters assumed in the Recommendation are not exceeded "[40] Therefore, the United States proposed to limit the maximum power spectral density fed to fixed service transmitter antennas at 55 78-56 26 GHz to -28.5 dB (W/MHz) However, WRC-2000 adopted a higher power spectral density limit of -26 dB (W/MHz) NTIA found the WRC-2000 power density limit unacceptable for domestic use, and requested that we adopt a limit of -28.5 dB (W/MHz) domestically. As indicated in Recommendation ITU-R SA 1279, this band is uniquely suited for remote temperature profile sensing in the atmosphere NTIA requested the tighter limit because passive measurements are extremely vulnerable to interference due to the variability of the atmosphere, which can have a dramatic impact on climate studies and the quality of weather predictions In the *Notice*, the Commission proposed to adopt the more stringent power density limit of -28.5 dB (W/MHz) recommended by NTIA. The Commission also proposed to adopt a new United States footnote to reflect the new power density limit

25 *Decision* No comments were filed addressing the proposed power spectral density

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[35] These nine footnotes are US369, US370, US371, US372, US373, US374, US375, US376, and US377. *See Amendment of Part 2 of the Commission's Rules to Make Non-Substantive Revisions to the Table of Frequency Allocations, Order* ("*Table Clean-up Order*") in DA No 02-1872, FCC 17 Rcd 15263 (August 5, 2002)

[36] The international and domestic footnotes created in the *Table Clean-up Order* contained essentially the same provisions

[37] *See* supra note 5 *See Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50 2-50 4 GHz and 51 4-71 0 GHz Bands, Report and Order* in ET Docket No 99-261, 15 FCC Rcd 25264 (2000)

[38] *See* supra note 5 at ¶ 29

[39] *See* ITU-R Recommendation SA 1279, "Spectrum sharing between spaceborne passive sensors and inter-satellite links in the range 50 2-59 3 GHz "

[40] *See* United States of America Proposals For The Work Of The [WRC-2000] Conference, Document 12-E, dated 12 January 2000, Proposals for agenda item 1 4 The proposed footnote in Document 12-E was modified at WRC-2000 to read as quoted above

limit We note that no licenses have been issued for operation in the fixed service in the 55 78-56.26 GHz band The Commission has only granted a few experimental licenses in this spectrum. We also understand that the current state of the art output power for fixed systems operating in this spectrum is 31 5 dBW/MHz. which is still several dB less than the power that would be permitted under the output power limit NTIA recommends We believe that adopting the power density limit recommended by NTIA will not have any significant immediate or near term impact on use of the 55 78-56 26 GHz band for fixed service now or in the immediate future Therefore, to protect EESS from unaccepted interference from fixed and mobile operations, we are adopting footnote US379 US379 will read as follows

> US379 In the band 55 78-56 26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered to fixed service transmitter antennas is limited to -28 5 dB(W/MHz)

We observe, however, that this technology is in its infancy Future developments may warrant use of higher power for the fixed service and we may find this can be accomplished without compromising interference protection for the EESS Therefore, we reserve the right to revisit this matter with the NTIA at a later time

PROCEDURAL MATTERS

A Final Regulatory Flexibility Certification

26 The Commission has prepared a Final Regulatory Flexibility Certification concerning this present action The Certification is set forth in Appendix B. This action realigns unused allocations in extremely high frequency bands above 76 GHz. This action conforms United States frequency allocations above 76 GHz to international allocations and adopts a domestic limit to protect the EESS from unacceptable interference Neither of these actions will affect existing operations.

B Final Paperwork Reduction Act of 1995 Analysis

27 This Report and Order does not contain an information collection subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13

C Contact Person

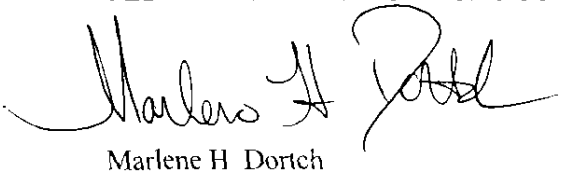
28. For additional information concerning this Report and Order, contact Shameeka Hunt at 202-418-2062, or via the Internet at Shameeka.Hunt@fcc.gov.

D Ordering Clauses

29 Accordingly, IT IS ORDERED that pursuant to Sections 1, 4, and 303, of the Communications Act of 1934, as amended, 47 U S.C Sections 151, 154, and 303, the Report and Order and the rules specified in Appendix A ARE ADOPTED

30 IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Report and Order, including the Final Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration

FEDERAL COMMUNICATIONS COMMISSION



Marlene H Dortch
Secretary

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
50 2-50 4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5 340 5 555A			50 2-50 4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
50 4-51 4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Mobile-satellite (Earth-to-space)			50 4-51 4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) G117	50 4-51 4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space)	
51 4-52 6 FIXED MOBILE 5 547 5 556			51 4-52 6 FIXED MOBILE		
52 6-54 25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5 340 5 556			52 6-54 25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
54 25-55 78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 556A SPACE RESEARCH (passive) 5 556B			54 25-55 78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 556A SPACE RESEARCH (passive)		
55 78-56 9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5 557A INTER-SATELLITE 5 556A MOBILE 5 558 SPACE RESEARCH (passive) 5.547 5 557			55 78-56 9 EARTH EXPLORATION-SATELLITE (passive) FIXED US379 INTER-SATELLITE 5 556A MOBILE 5 558 SPACE RESEARCH (passive) US263 US353		
56 9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5 558A MOBILE 5 558 SPACE RESEARCH (passive)			56 9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE G128 MOBILE 5 558	56 9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5 558 SPACE RESEARCH	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547			65-66 EARTH EXPLORATION-SATELLITE FIXED MOBILE except aeronautical mobile SPACE RESEARCH	65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH	
66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554			66-71 MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	66-71 INTER-SATELLITE MOBILE 5.553 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)			71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) US389		Fixed Microwave (101)
74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.559A 5.561			74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Space research (space-to-Earth) US387 US389	74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) US387 US389	
76-77.5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149			76-77 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth) US342	76-77 RADIO ASTRONOMY RADIOLOCATION Amateur Space research (space-to-Earth) US342	RF Devices (15) Amateur (97)

APPENDIX A

FINAL RULES

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR Part 2 as follows

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1 The authority citation for part 2 continues to read as follows

Authority 47 U S C 154, 302a, 303, and 336, unless otherwise noted.

2 Section 2 106, the Table of Frequency Allocations, is amended as follows

a Revise pages 79 and 81 through 90

b In the list of International Footnotes, remove footnotes 5 563 and 917, remove headings "I New Numbering Scheme" and "II· Old Numbering Scheme", and remove Note immediately following the heading "INTERNATIONAL FOOTNOTES "

c In the list of United States (US) Footnotes, revise footnotes US74, US211, US246, US263, and US342, remove footnotes US369, US370, US371, US372, US373, US374, US375, and US376; and add footnote US379

The revisions and addition read as follows·

§ 2.106 Table of Frequency Allocations.

* * * * *

	77-77 5 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth) US342	77-77 5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) US342	RF Devices (15) Amateur (97)
77 5-78 AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 5 149	77 5-78 Radio astronomy Space research (space-to-Earth) US342	77 5-78 AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) US342	Amateur (97)
78-79 RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5 149 5 560	78-79 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth) 5 560 US342	78-79 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5 560 US342	
79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5 149	79-81 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth) US342	79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) US342	
81-84 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5 149 5 561A	81-84 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) US342 US388 US389		Fixed Microwave (101)

	77-77 5 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth) US342	77-77 5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) US342	RF Devices (15) Amateur (97)
77 5-78 AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 5 149	77 5-78 Radio astronomy Space research (space-to-Earth) US342	77 5-78 AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) US342	Amateur (97)
78-79 RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5 149 5 560	78-79 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth) 5 560 US342	78-79 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5 560 US342	
79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	79-81 RADIO ASTRONOMY RADIOLOCATION Space research (space-to-Earth) US342	79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) US342	
81-84 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5 149 5 561A	81-84 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) US342 US388 US389		Fixed Microwave (101)

185-190 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 562H SPACE RESEARCH (passive)	185-190 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 562H SPACE RESEARCH (passive)	
190-191 8 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5 340	190-191 8 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246	
191 8-200 FIXED INTER-SATELLITE MOBILE 5 558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5 149 5 341 5 554	191 8-200 FIXED INTER-SATELLITE MOBILE 5 558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5 341 5 554 US211 US342	
200-209 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340 5 341 5 563A	200-209 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5 341 5 563A US246	
209-217 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5 149 5 341	209-217 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5 341 US342	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
217-226 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 149 5 341			217-226 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 341 US342		
226-231 5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340			226-231 5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) US246		
231 5-232 FIXED MOBILE Radiolocation			231 5-232 FIXED MOBILE Radiolocation		
232-235 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation			232-235 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation		
235-238 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5 563A 5 563B			235-238 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5 563A 5 563B		
238-240 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE			238-240 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE		
240-241 FIXED MOBILE RADIOLOCATION			240-241 FIXED MOBILE RADIOLOCATION		

100-102 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340 5 341	100-102 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5 341 US246	
102-105 FIXED MOBILE RADIO ASTRONOMY 5 149 5 341	102-105 FIXED MOBILE RADIO ASTRONOMY 5 341 US342	
105-109 5 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 149 5 341	105-109 5 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 341 US342	
109 5-111 8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340 5 341	109 5-111 8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5 341 US246	
111 8-114 25 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 149 5 341	111 8-114 25 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 341 US342	
114 25-116 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340 5 341	114 25-116 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5 341 US246	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
116-119 98 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 562C SPACE RESEARCH (passive) 5 341			116-122 25 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 562C SPACE RESEARCH (passive)		ISM Equipment (18)
119 98-122 25 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 562C SPACE RESEARCH (passive) 5 138 5 341			5 138 5 341 US211		
122 25-123 FIXED INTER-SATELLITE MOBILE 5 558 Amateur 5 138			122 25-123 FIXED INTER-SATELLITE MOBILE 5 558 5 138	122 25-123 FIXED INTER-SATELLITE MOBILE 5 558 Amateur 5 138	ISM Equipment (18) Amateur (97)
123-130 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5 562D 5 149 5 554			123-130 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5 554 US211 US342		
130-134 EARTH EXPLORATION-SATELLITE (active) 5 562E FIXED INTER-SATELLITE MOBILE 5 558 RADIO ASTRONOMY 5 149 5 562A			130-134 EARTH EXPLORATION-SATELLITE (active) 5 562E FIXED INTER-SATELLITE MOBILE 5 558 RADIO ASTRONOMY 5 562A US342		
134-136 AMATEUR AMATEUR-SATELLITE Radio astronomy			134-136 Radio astronomy	134-136 AMATEUR AMATEUR-SATELLITE Radio astronomy	Amateur (97)
136-141 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5 149			136-141 RADIO ASTRONOMY RADIOLOCATION US342	136-141 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite US342	

141-148 5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5 149	141-148 5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US342	
148 5-151 5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340	148 5-151 5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246	
151 5-155 5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5 149	151 5-155 5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION US342	
155.5-158 5 EARTH EXPLORATION-SATELLITE (passive) 5 562F FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 149 5 562G	155 5-158 5 EARTH EXPLORATION-SATELLITE (passive) 5 562F FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5 562B 5 562G US342	
158 5-164 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	158 5-164 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) US211	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
164-167 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340			164-167 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
167-174 5 FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5 558 5 149 5 562D			167-174 5 FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5 558 US211 US342		
174 5-174 8 FIXED INTER-SATELLITE MOBILE 5 558			174 5-174 8 FIXED INTER-SATELLITE MOBILE 5 558		
174 8-182 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 562H SPACE RESEARCH (passive)			174 8-182 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 562H SPACE RESEARCH (passive)		
182-185 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340			182-185 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) US246		

241-248 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5 138 5 149	241-248 RADIO ASTRONOMY RADIOLOCATION 5 138 US342	241-248 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5 138 US342	ISM Equipment (18) Amateur (97)
248-250 AMATEUR AMATEUR-SATELLITE Radio astronomy 5 149	248-250 Radio astronomy US342	248-250 AMATEUR AMATEUR-SATELLITE Radio astronomy US342	Amateur (97)
250-252 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5 340 5 563A	250-252 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5 563A US246		
252-265 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5 149 5 554	252-265 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5 554 US211 US342		
265-275 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5 149 5 563A	265-275 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5 563A US342		
275-1000 (Not allocated) 5 565	275-1000 (Not allocated) 5 565		

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

US74 In the bands 25 55-25.67, 73 0-74 6, 406 1-410 0, 608-614, 1400-1427, 1660.5-1670.0, 2690-2700, and 4990-5000 MHz and in the bands 10 68-10 7, 15 35-15 4, 23 6-24 0, 31.3-31 5, 86-92, 100-102, 109 5-111 8, 114.25-116, 148 5-151 5, 164-167, 200-209, and 250-252 GHz, the radio astronomy service shall be protected from extraband radiation only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with technical standards or criteria applicable to the service in which it operates Radio astronomy observations in these bands are performed at the locations listed in US311

* * * * *

US211 In the bands 1670-1690, 5000-5250 MHz and 10 7-11 7, 15 1365-15.35, 15.4-15 7, 22 5-22 55, 24-24 05, 31 0-31 3, 31 8-32 0, 40 5-42 5, 116-122 25, 123-130, 158 5-164, 167-168, 191 8-200, and 252-265 GHz, applicants for airborne or space station assignments are urged to take all practicable steps to protect radio astronomy observations in the adjacent bands from harmful interference, however, US74 applies

* * * * *

US246 No station shall be authorized to transmit in the following bands.
608-614 MHz, except for medical telemetry equipment,[1]
1400-1427 MHz,
1660 5-1668 4 MHz,
2690-2700 MHz,
4990-5000 MHz,
10 68-10 7 GHz,
15 35-15.4 GHz,
23 6-24 GHz,
31 3-31 8 GHz,
50 2-50 4 GHz,
52 6-54 25 GHz,
86-92 GHz,
100-102 GHz,
109 5-111 8 GHz,
114 25-116 GHz,
148 5-151 5 GHz,
164-167 GHz,
182-185 GHz,
190-191 8 GHz,
200-209 GHz,
226-231.5 GHz,
250-252 GHz

* * * * *

[1] Medical telemetry equipment shall not cause harmful interference to radio astronomy operations in the band 608-614 MHz and shall be coordinated under the requirements found in 47 C F R § 95 1119

US263 In the bands 21 2-21 4 GHz, 22 21-22 5 GHz, 36-37 GHz, and 56 26-58 2 GHz, the space research and Earth exploration-satellite services shall not receive protection from the fixed and mobile services operating in accordance with the Table of Frequency Allocations

* * * * *

US342 In making assignments to stations of other services to which the bands

13360-13410 kHz	22 21-22 5 GHz	129 23-129 49 GHz
25550-25670 kHz	22 81-22 86 GHz	130-134 GHz
37 5-38 25 MHz	23 07-23 12 GHz	136-148 5 GHz
322-328 6 MHz	31.2-31 3 GHz	151 5-158.5 GHz
1330-1400 MHz	36 43-36 5 GHz	168 59-168 93 GHz
1610 6-1613 8 MHz	42 5-43 5 GHz	171 11-171 45 GHz
1660-1670 MHz	48 94-49 04 GHz	172 31-172 65 GHz
3260-3267 MHz	76-86 GHz	173 52-173.85 GHz
3332-3339 MHz	92-94 GHz	195 75-196 15 GHz
3345 8-3352 5 MHz	94 1-100 GHz	209-226 GHz
4825-4835 MHz	102-109 5 GHz	241-250 GHz
14 47-14 5 GHz	111 8-114 25 GHz	252-275 GHz
22 01-22 21 GHz	128.33-128 59 GHz	

are allocated, all practicable steps shall be taken to protect the radio astronomy service from harmful interference Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4 5 and 4 6 and Article 29 of the ITU Radio Regulations)

* * * * *

US379 In the band 55 78-56 26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered by a transmitter to the antenna of a fixed service station is limited to -28 5 dB(W/MHz)

* * * * *

APPENDIX B

FINAL REGULATORY FLEXIBILITY CERTIFICATION

The Regulatory Flexibility Act of 1980, as amended (RFA),[2] requires that an initial regulatory flexibility analyses be prepared for notice-and-comment rule making proceedings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial *number of small entities*."[3] *The RFA generally defines the term "small entity" as having the same* meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[4] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[5] A "small business concern" is one which (1) is independently owned and operated, (2) is not dominant in its field of operation, and (3) satisfies any additional criteria established by the Small Business Administration (SBA).[6]

In this Report and Order, we realign allocations in the bands 76-81 GHz and 95-1000 GHz consistent with the international allocation changes obtained at WRC-2000. This action aligns passive allocations for RAS and EESS services with spectrum that is more suited for such operations and continues the Commission's efforts to promote the commercial development and growth of the "millimeter wave" spectrum, which will provide for future developments in technology and equipment. In this Report and Order, we also adopt domestically the United States proposal at WRC-2000 in regards to the maximum power density delivered by a transmitter to the antenna of a fixed service in the 55.78-56.26 GHz band. This action protects EESS from unaccepted interference from fixed and mobile operations. These adopted changes will not cause a significant adverse economic impact to small entities because there are no licensed commercial uses above 76 GHz, that is, no incumbent licensees will be affected. Service rules will be adopted in later proceedings, as appropriate.

Therefore, we certify that the requirements of the Report and Order will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the Report and Order, including a copy of this Final Regulatory Flexibility Certification, in a report to Congress pursuant to the Congressional Review Act.[7] In addition, the Report and Order and this final certification will be sent to the Chief Counsel for Advocacy of the SBA, and will be published in the Federal Register.[8]

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[2] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. N. 104-121, Title II, 110 Stat. 857 (1996).

[3] 5 U.S.C. § 605(b).

[4] 5 U.S.C. § 601(6).

[5] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[6] 15 U.S.C. § 632.

[7] *See* 5 U.S.C. § 801(a)(1)(A).

[8] *See* 5 U.S.C. § 605(b).

SEPARATE STATEMENT OF COMMISSIONER JONATHAN S. ADELSTEIN

Re *Amendment of Part 2 of the Commission's Rules to Realign the 76-81 GHz and the Frequency Range Above 95 GHz Consistent with International Allocation Changes, ET Docket No. 03-102*

I support our decision to realign the allocations in the 76-81 GHz and above 95 GHz bands to generally conform with international allocations established at WRC-2000. I am hopeful that these changes will provide enhanced opportunities for future earth exploration satellite and radio astronomy services.

I write separately to also express my strong support for the vehicular radio services that currently use the 76-77 GHz band and those that currently use the 24 GHz band and may migrate to 77-81 GHz segment. I think that these services, such as adaptive cruise control and short range automotive radars, are exciting and productive new technologies, and we should continue to encourage their ongoing development and deployment.

I am pleased that we conclude in this item that sharing conflicts are highly unlikely in the bands between future operations of the scientific satellite services and the vehicular radar community, and that we do not impose any operational limitations on vehicular radar systems. I want to encourage the continued growth of these vehicular services because of their many consumer and safety benefits.